

I claim:

1. A rotary electric machine, comprising:

a stator having a plurality of windings;

a hollow shaft having an axial end region, the shaft being mounted within the stator for rotation about an axis, the shaft further having at least one radial orifice;

an inlet for a cooling fluid in the axial end region of the shaft;

a rotor core integral to and coaxial with the hollow shaft, the rotor core having at least one electromagnetic device formed integral therewith, each electromagnetic device being disposed in apposition to one of the plurality of stator windings; and

a generally radial outward passageway through the rotor core, wherein the passageway has an entry for the cooling fluid at the inner diameter of the core, the entry being aligned with one of the shaft radial orifices, and the passageway further having an outlet, the outlet being arranged to discharge the cooling fluid onto at least one of the electromagnetic devices.

2. The machine of claim 1, wherein the rotor core further comprises a plurality of laminations, at least one pair of adjacent laminations having periodic slots, wherein the pair of adjacent laminations is sandwiched between a pair of laminations without slots, such that the slots in the adjacent laminations form a continuous, zigzag, generally radial outward passageway.

3. The machine of claim 2, wherein the pair of adjacent laminations further comprises two laminations having an identical pattern of slots, the two laminations being rotated a number of degrees from each other.

1 4. The machine of claim 2, wherein the laminations are bonded together by a  
2 process selected from the group consisting of edge welding, adhesive  
3 bonding, and mechanical fastening.

1 5. The machine of claim 1, wherein the electromagnetic device is a winding.

1 6. The machine of claim 1, wherein the machine is a generator.

1 7. The machine of claim 1, wherein the machine is a variable frequency  
2 generator.

1 8. The machine of claim 1, wherein the machine is a motor.

1 9. A rotary electric machine, comprising:

a stator having a plurality of windings;

a rotor core being mounted within the stator for rotation about an axis, the  
rotor core having at least one electromagnetic device formed integral  
therewith, each of the electromagnetic devices being disposed in apposition  
to one of the plurality of stator windings;

an inlet for a cooling fluid in an axial end region of the rotor core, and

a generally radial outward passageway through the rotor core, wherein the  
passageway has an entry for the cooling fluid at the inner diameter of the  
rotor core, the passageway further having an outlet, the outlet being arranged  
to discharge the cooling fluid onto at least one of the electromagnetic devices.

1 10. The rotary electric machine of claim 9, wherein the rotor core further  
2 comprises a plurality of laminations, at least one pair of adjacent laminations  
3 having periodic slots, wherein the pair of adjacent laminations is sandwiched  
4 between a pair of laminations without slots, such that the slots in the adjacent  
5 laminations form a continuous, zigzag, generally radial outward passageway.

1 11. The machine of claim 10, wherein the pair of adjacent laminations further  
2 comprises two laminations having an identical pattern of slots, the two  
3 laminations being rotated a number of degrees from each other.

1 12. The machine of claim 10, wherein the laminations are bonded together  
2 by a process selected from the group consisting of edge welding, adhesive  
3 bonding, and mechanical fastening.

1 13. The machine of claim 9, wherein the electromagnetic device is a winding.

1 14. The machine of claim 9, wherein the machine is a generator.

1 15. The machine of claim 9, wherein the machine is a variable frequency  
generator.

16. The machine of claim 9, wherein the machine is a motor.